What is claimed is:

1. A plasma processing system that propagates plasma-producing radio-frequency waves generated by a radio-frequency power supply system through a flat antenna and a radio-frequency wave transmitting window into a vacuum vessel, produces a plasma by ionizing a process gas supplied into the vacuum vessel by the energy of the radio-frequency waves and processes a substrate placed on a substrate table arranged in the vacuum vessel with the plasma;

wherein an electromagnetic wave absorber is disposed so as to surround a region between a surface of the radio-frequency wave transmitting window on a side of a vacuum atmosphere in the vacuum vessel and the antenna.

2. The plasma processing system according to claim 1, wherein the electromagnetic wave absorber is divided into a plurality of divisions, the divisions are arranged at circumferential intervals with spaces formed between the adjacent divisions.

3. The plasma processing system according to claim 2, wherein a circumferential length of each of the divisions and a circumferential length of each of the spaces between the divisions are smaller than $\lambda_g/2$, where λ_g is a wavelength of the radio-frequency waves.

4. The plasma processing system according to any one of claims 1 to 3, wherein the electromagnetic wave absorber has a cross section of a circumferential width that decreases toward the center of the vacuum vessel.

5. A plasma processing system that propagates plasma-producing radio-frequency waves generated by a radio-frequency power supply system through a flat antenna and a radio-frequency wave transmitting window into a vacuum vessel, produces a plasma by ionizing a process gas supplied into the vacuum vessel by the energy of the radio-frequency waves and

processes a substrate placed on a substrate table arranged in the vacuum vessel with the plasma;

wherein a region between an area between the radio-frequency wave transmitting window and a plasma luminescent area, and a surface of the radio-frequency wave transmitting window on the side of the antenna is divided in a direction perpendicular to the direction of propagation of the radio-frequency waves by conductive members.

6. The plasma processing system according to claim 5, wherein an end part of the conductive member on a side of the substrate table extends into the plasma luminescent area.

7. The plasma processing system according to claim 6, wherein length of the end part of the conductive member extending in the plasma luminescent area is in a range of 5 to 10 mm.

8. The plasma processing system according to claim 5, wherein the conductive member includes a circular or annular first conductive element substantially coaxial with a center axis of the substrate table.

9. The plasma processing system according to claim 8, wherein the conductive member includes an annular second conductive element surrounding the first conductive element and concentric with the first conductive element.

10. The plasma processing system according to claim 8 or 9, wherein the first conductive element has an inside diameter R1 meeting an inequality: $\lambda/2 \leq R1 < \lambda$.e R2, where λ is wavelength of the radio-frequency waves.

11. The plasma processing system according to claim 9, wherein the first conductive element has an inside diameter R1 meeting an inequality: $\lambda/2 \leq R1 < \lambda$ and a distance R2 between the concentric first and the second conductive elements meet an inequality: $\lambda/2 \leq R2 < \lambda$, where λ is wavelength of the radio-frequency waves.

12. The plasma processing system according to claim 5, wherein the region is divided by a plurality of radial conductive elements arranged at angular intervals.